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# **Municipal Systems Impact Analyses**

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# Water System Impact Analysis



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**Memorandum**

To: Town of Wellesley Planning Board

Date: July 24, 2009

Project No.: 09733.26

From: VHB Land Development

Re: Wellesley CVS - PSI  
Water System Impact Analysis

This memorandum summarizes the analysis of Project-generated impacts on the municipal water system infrastructure.

**Water Demand**

The site presently has three buildings total, two formerly used as an automotive dealership and a third accessory building used for storage. The buildings are largely unused. The potential estimated design flow for the existing site is approximately 867 gallons per day (gpd). The project proposes to demolish the existing buildings and construct a new 12,900 square foot CVS/Pharmacy. The water design flow estimate for the proposed development is calculated as 710 gpd. The estimated design flows are derived by inflating the Massachusetts Department of Environmental Protection sewer flow estimates by 10% in order to account for water consumption and irrigation. The attached water design flow calculations show that the proposed project will result in a decrease in water usage of approximately 157 gpd. The water usage and sewer design flow calculations are included in the Sewer System Impact Analysis memorandum.

**Conceptual Water System Layout**

The proposed CVS/Pharmacy development will include a new 6-inch connection for fire protection and 1 ½-inch connection for domestic service to the existing 8-inch water main in Worcester Street (Route 9). This water main currently provides a connection to the project site. The preliminary water line layout for the project is indicated on the project plans ("C-4 Utility Plan").



Project: CVS/PHARMACY Project # 09733.26  
Location: WELLESLEY, MA Sheet 1 of 1  
Calculated by: AJS Date: 5/13/2009  
Checked by: GG Date: 5/13/09  
Title: POTABLE WATER DESIGN FLOW CALCULATIONS

FIND: POTABLE WATER DESIGN FLOW FOR EXISTING AUTO DEALERSHIP  
VS. PROPOSED CVS/PHARMACY.

GIVEN: SANITARY SEWER FLOW ESTIMATES FOR EACH USE PER  
MADEP TITLE V GUIDELINES:

DEALERSHIP = 788 GPD } SEE SEWER CALCULATIONS  
CVS = 645 GPD } ENCLOSED IN THIS  
ANALYSIS.

SOLUTION: POTABLE WATER USE  $\approx$  SEWER FLOW  $\times$  110%.

(TYPICAL. ACCOUNTS FOR WATER LOST  
THROUGH CONSUMPTION & IRRIGATION)

$$Q_{\text{DEALERSHIP}} = 788 \text{ GPD} \times 1.10 = 867 \text{ GPD}$$

$$Q_{\text{CVS}} = 645 \text{ GPD} \times 1.10 = 710 \text{ GPD}$$

$$\Delta Q = 157 \text{ GPD DECREASE FROM EXISTING CONDITION}$$

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# Sewer System Analysis



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**Memorandum**

To: Town of Wellesley Planning Board

Date: July 24, 2009

Project No.: 09733.26

From: VHB Land Development

Re: Wellesley CVS - PSI  
Sewer System Impact Analysis

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This memorandum summarizes the analysis of Project-generated impacts on the municipal sanitary sewer infrastructure.

**Existing System**

Under existing conditions, the sanitary sewer flows from two existing structures on-site (showrooms and service bays) are collected into one sewer manhole before connecting into Worcester Street. The sewer flows from the 1,475 s.f. existing building flows into a 4" line that runs north to a manhole just outside of this building. The 9,743 s.f. existing building flows into a 4" line that runs to this same existing manhole. From here, both sewer flows are combined before connecting to Worcester Street. The municipal trunk line ultimately discharges to the MWRA Sewer System and is treated at Deer Island Waste Water Treatment Plant.

**Sanitary Sewer Generation**

Sanitary Sewer design flows for the existing buildings and the proposed CVS/Pharmacy development were estimated using Massachusetts Department of Environmental Protection (DEP) sewer design rates. The existing sanitary sewer design flow rate from the existing showrooms and service bays is calculated to be approximately 788 gallons per day (gpd). The proposed CVS/Pharmacy development will have a design flow of approximately 645 gpd. The proposed CVS/Pharmacy development will result in a net decrease in sanitary sewer design flow of approximately 143 gpd as compared to the existing design flow rate. Estimated existing and proposed sanitary sewer generation rates calculations are attached to this memorandum.



Project: CVS/PHARMACY Project # 09733.26  
 Location: WILLESLEY, MA Sheet 1 of 2  
 Calculated by: AJS Date: 9/8/09  
 Checked by: GFG Date: 10/8/09  
 Title: SANITARY SEWER DESIGN FLOW CALCULATIONS

FIND: SEWER DESIGN FLOW TO TOWN SYSTEM GENERATED BY EXISTING  
 AUTO DEALERSHIP VS. PROPOSED CVS/PHARMACY.

GIVEN: MA DEP SEWER FLOW DESIGN RATES PER 30 CM2 BLDG  
 (TITLE V) AS LISTED IN SEC. 15.203.

SOLUTION: EXISTING AUTO DEALERSHIP

↳ COMPRISED OF: 9734 SF SHOWROOM  
 1475 SF SERVICE BLDG (2 BAYS)

$$Q_{(Flow)} \text{ FOR SHOWROOM} = 9734 \text{ SF} \times \frac{50 \text{ GPD}}{1000 \text{ SF}} = 487.2 \text{ GPD}$$

↳ DESIGN RATE FOR  
 RETAIL ESTABLISHMENT

$$Q \text{ FOR SERVICE BLDG} = 2 \text{ BAYS} \times \frac{150 \text{ GPD}}{\text{BAY}} = 300 \text{ GPD}$$

↳ DESIGN RATE FOR  
 SERVICE STATION

$$Q_{TOTAL} = 487.2 + 300 = 787.2 \approx 788 \text{ GPD}$$

Project: CVS/PHARMACY

Project # 09733.26

Location: WELLESLEY, MA

Sheet 2 of 2

Calculated by: AJS

Date: 5/8/09

Checked by: GG

Date: 5/8/09

Title: SANITARY SEWER FLOW CALCULATIONS

PROPOSED CVS/PHARMACY

$$Q = 12,900 \text{ SF} \times \frac{50 \text{ GPD}}{1000 \text{ SF}} = 645 \text{ GPD}$$

$$\Delta Q_{(EX \rightarrow PR)} = 788 \text{ GPD} - 645 \text{ GPD}$$

$$= 143 \text{ GPD DECREASE IN FLOW UNDER PROPOSED CONDITIONS}$$

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# Storm Drainage Impact Analysis



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**Memorandum**

To: Town of Wellesley Planning Board

Date: July 29, 2009

Project No.: 09733.26

From: VHB Land Development

Re: Wellesley CVS - PSI  
Stormwater Management

The proposed project site has filed and received approval of a Notice of Intent application with the Town of Wellesley's Wetland Protection Committee. The Project's Stormwater management system was reviewed as part of this application by a peer reviewer, Beta Engineering of Norwood, Massachusetts. It was the peer reviewer's opinion to the Wellesley Wetland Protection Committee the stormwater management designed for the project was in compliance with the 2008 Massachusetts Stormwater Standards. Attached as an addendum to this memorandum is the approved Order of Conditions for the site as identified by DEP#324-607 - 984, 990 & 990R Worcester Street CVS pharmacy.

It is the applicant's request that the Stormwater management system designed for this project and reviewed under the Notice of Intent application be accepted by the Wellesley Planning Board.

This memorandum is a brief excerpt of the approved Stormwater Report to provide detail to understand the impacts of the project on the municipal stormwater system.

**Introduction**

The proposed project is a 2.07 acre Site (the "Site"), located at 984-990 Worcester Turnpike in the Town of Wellesley, Norfolk County, Massachusetts (see Figure 1). The Site is bounded by Worcester Turnpike (Route 9) to the north, retail to the east, and Bogle Brook to the west and south. The Site is currently zoned as Business A and is located within the Water Supply Protection Overlay District. Wetland Resources on the Site include bordering vegetated wetlands and riverfront area located along the west and south portions of the Site. The Site is located within the surface watershed of Morse's Pond.

The Site presently has three vacant buildings that were formerly used as an automotive dealership, a gasoline service station, and storage shed. The remainder of the Site is primarily paved with areas of hard packed gravel used for parking. Under existing conditions, most of the untreated surface stormwater runoff flows directly to the wetlands to the west and south portions of the Site. A small amount of runoff from the entrance drives flows toward the property line along Worcester Turnpike and an additional small portion of runoff east of the existing buildings flows toward the eastern property line.

The proposed redevelopment of the Site includes the demolition of the three existing vacant buildings and the construction of a new 12,900 square foot CVS/Pharmacy retail store with a drive-through window, associated parking and Site improvements (the "Project"). Under proposed conditions, the majority of Site stormwater runoff will flow into a new closed drainage system and be treated with catch basins with deep sumps, oil/debris traps and a water quality unit before discharging into a surface infiltration basin and then to the existing wetlands. Runoff from a small portion of the parking lot adjacent to Worcester Turnpike will be directed to a rain garden before discharging to the wetlands. These treatment measures have been designed to protect the surrounding natural resources from potential stormwater runoff impacts. Whenever possible, existing drainage patterns were maintained in the proposed design.

#### **Hydrologic Analysis Methodology**

A HydroCAD model, using TR-20 methodology, was developed to evaluate the existing and proposed drainage conditions on the Site. The results of the analyses indicate that there is no increase in peak discharge rates between the pre- and post-development conditions for the 2-, 10-, 25- and 100-year storm events. The pre- and post-development peak discharge values are presented in Table 1 below.

The existing and proposed conditions are described below:

#### **Existing Conditions**

Under existing conditions, the 2.0± acre site is mainly comprised of impervious rooftop and pavement and compacted gravel surfaces. For the existing conditions hydrologic analysis, the Site was divided into three (3) drainage areas that contribute to three (3) design points, where peak discharge rates were evaluated (see Figure 2). The majority of these flows discharge to the wetlands to the west and south of the Site, Design Point 1. A small amount of runoff flows to abutting easterly property, Design Point 2 and Worcester Turnpike (Route 9), Design Point 3.

#### **Proposed Conditions**

The Project, which will include the construction of a pharmacy with a drive-through window, associated parking and Site improvements, was designed to comply with the Massachusetts Stormwater Management Policy, including the new 2008 regulations. Existing drainage and grading patterns were maintained to the maximum extent possible.

The proposed redevelopment has been designed to direct stormwater runoff from the rooftop and the impervious areas to a new closed drainage system. Most runoff from these impervious areas on the Site is collected in catch basins with 4-foot deep sumps and oil/debris traps. Stormwater runoff is additionally treated with a water quality unit and routed through a surface infiltration basin, before discharging to the wetlands. A small portion of the Site flows overland to a rain garden that stores and treats the contributing water quality volume and discharges to the wetlands. The proposed Project is a land use with higher potential pollutant loads (LUHPPL). The water quality unit, in conjunction with catch basins with deep sumps will provide the required minimum 44% TSS removal prior to the infiltration basin. The proposed drainage system will reduce runoff rates to all design points throughout the site as noted in Table 1.

**Table 1**  
**Peak Discharge Rates (cfs\*)**

Design Point	2-year	10-year	25-year	100-year
<b>Design Point 1: Wetlands</b>				
Existing	4.8	7.1	8.6	10.5
Proposed	2.2	4.9	7.9	10.0
<b>Design Point 2: East Abutter</b>				
Existing	0.2	0.4	0.5	0.6
Proposed	0.1	0.1	0.2	0.2
<b>Design Point 3: Route 9</b>				
Existing	0.4	0.6	0.7	0.8
Proposed	0.1	0.2	0.2	0.2

\* Expressed in cubic feet per second

### Stormwater Quality

Proposed impervious surfaces in the development are designed to meet the Department of Environmental Protection's Stormwater Management Regulations and Town of Wellesley standards. In addition, a large area of the existing parking lot will be reconstructed to meet the same criteria. The design will include catchbasins with deep sumps and hoods, a parking lot sweeping program, structural water quality devices, and a detailed maintenance program. This stormwater management system will provide 80-percent removal of Total Suspended Solids (TSS). This will provide a vast upgrade to the water quality of the stormwater leaving the site and entering the wetlands and ultimately to Morse Pond, as the existing site has no water quality features prior to discharge to this design point.

### Recharge

Runoff from impervious surfaces discharging to the wetlands will be routed and temporarily stored in a surface infiltration basin designed to promote infiltration and groundwater recharge. This basin is located near the southern property line behind the building.

### Conclusion

Stormwater runoff generated from impervious areas on the proposed development site, contributing to the wetlands, will be collected and treated for TSS removal before being directed to a surface infiltration basin. The basin is designed to provide infiltration and groundwater recharge per the Massachusetts DEP requirements prior to discharge to the existing wetlands. Peak discharge rates will be reduced to all three design points analyzed as part of the stormwater management system. Water quality for the site will also be improved by the implementation of the proposed stormwater system, as there are no water quality measures under the existing conditions.